

**SECRET**

CONTRACT

25X1

PAR 220

1 June 64

SUBJECT: Use of Static Electricity for Film Hold Down

**TASK/PROBLEM**

1. Investigate possible means to hold film flat or in a given plane through the use of static electricity. Intended use is to hold films flat in rear projection and direct viewers without a covering glass or the complexities of a vacuum system.

**DISCUSSION**

2. The subject PAR was reviewed and it is felt that a complete investigation requires at least a study of all items outlined in the original proposal. It is also probably true that additional problems or direction of study will be found as the work progresses.

3. Preliminary investigation has shown that it is relatively easy to charge and hold down thin base materials to a glass platen. A more extensive investigation and study will be necessary to solve the problem of holding down heavy base materials without the addition of some other physical means such as a vacuum assist. Preliminary investigation has also shown that the electrostatic forces produce such an excellent contact between film and platen, that severe newton rings appear. Various methods of reducing the newton rings will be investigated and their effect on reducing or increasing the electrostatic forces available for holding the film. A very difficult problem exists in finding an effective method of eliminating the charge (or film polarization), and hold down force when it is desired to strip the film from

**GROUP-1**  
Excluded from automatic downgrading  
and declassification

Declass Review by  
NIMA/DOD

**SECRET**

**SECRET**

1 June 64

the platen. The film can be forcibly stripped from the platen with the accompaniment of sparking, but a danger of scratching exists. This method could only be successful if a peeling type action is used. Investigations will be made to find a method of eliminating the hold-down force so that the film separates from the platen with a minimum of force. It appears that in addition to the electrostatic charges present, polarization of the film contributes a large factor in the hold-down force. Preliminary investigation in reducing external electric fields around the film to eliminate the dust attraction problem has shown that it is possible to use film in an electrically polarized condition for hold down rather than maintaining an actual charge on its surface. This type of mechanism reduces the dust attraction problem but may possibly increase the problem of removing the film from the platen.

4. The use of electrostatic forces opens a new avenue of approach in that it is possible to hold in excellent contact an overlay of two and possibly more pieces of film either in free air or in contact with a platen. This possibility will be investigated and reported.

5. A question was brought up concerning the necessity of an electrically driven film transport for the breadboard. It is felt that investigating the use of repelling electrostatic forces during film transport through a gate will require controlled tensions and film speeds in order to fully determine the characteristics of this method.

#### PLANNED ACTIVITY

6. Further work awaits customer action on the proposed PAR as submitted.

**GROUP-1**  
**Excluded from automatic downgrading**  
**and declassification**

**SECRET**